

# Training program on Supervisory



Ethiopian Textile Industry Development Institute  
(ETIDI)

## “BASIC GARMENT TERMINOLOGY”

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# Garment Terminologies

- ❖ Production
- ❖ Productivity
- ❖ Capacity
- ❖ Efficiency
- ❖ Contracted Time
- ❖ Attended Time
- ❖ Produced Time
- ❖ Operator Performance
- ❖ On-Standard
- ❖ Off-standard
- ❖ Floater/Jumper



# Production

- Production is the act or process of producing something
- Production in mathematical sense is number of goods or services produced
- Is a figure or a numeric value which is indicator of **quantity produced** or **Output** from a production facility in given **time**.
- Production doesn't give the idea about how much to produce that
  - ❑ The production on a given day from a factory is 2400 shirts.
  - ❑ Yarn production from a spinning plant in one shift is 10 tonnes



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# Productivity

- ❑ Measure of performance towards an established goal, based on relationship between inputs and outputs
- ❑ The ratio of output produced to the input resources utilized in the production
- ❑ The ratio of output to some or all of the resources used to produce the output

$$\text{Productivity} = \text{Output/Input}$$



# Cont..

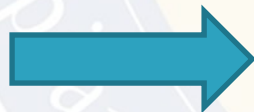


**Output  
(Production)**



❑ Pieces of jackets, pieces of shirts, pieces of baby dresses, Pieces of trousers, t-shirts etc...

**Input  
(Resources)**



❑ Meters of fabrics, kilowatt-hours, worker-hours, machine-hours and others



# Production Vs. Productivity



**Greater the Production, Greater will be the Productivity**

TRUE

FALSE

❖ **Company A produces 700 pieces of Jackets**

❖ **Company B produces 1500 pieces of T-shirt**

Which one is with higher productivity?

**Productivity but not production is the true indicator of how a factory is performing**

TRUE

FALSE



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# Production Vs. Productivity



- **Production** is concerned with the activity of producing goods
- **Productivity** is concerned with the efficient utilization of resources (inputs) in producing goods (outputs)
- In quantitative terms, production is the quantity of outputs produced, while productivity is the ratio of output produced to the input(s) used.



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# Basic productivity measurement



- The two basic and commonly used approaches for the measuring productivity are as follows:
  - Partial productivity
  - Total productivity



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# Basic productivity measurement

**Total Productivity:** is the ratio of the total output to the sum of all input factors . A total productivity measure reflects the joint impact of all inputs in producing the output .

## Advantages :

➤ Since it considers all the quantifiable output and input factors, it is more accurate representation of the real economic picture of the enterprise.

## Disadvantages :

➤ It does not pinpoint the real cause of decline in growth .We cannot specify which particular inputs – workers , material , capital , energy etc are being utilized inefficiently



**Partial productivity:** is the ratio of the total output to any single input.



- Labor productivity = units produced /hours worked , expressed in output per man hour.
- Capital productivity = output/capital input
- Material productivity = output/materials input

### Advantages :

- Partial productivity measures are easy to understand and use .
- It is a good diagnostic tool for pinpointing improvement areas .

### Disadvantages :

- If used alone it can be misleading and may lead to costly mistakes .
- Partial measures cannot be used to explain overall cost increases .



# Example



□ Suppose a company produces 4,000 pieces of jackets by employing 50 people at 8 hours per day for 25 days.

*A) Calculate the productivity of the company?*

*B) If the enterprise increase its production to 4,800 jackets by hiring 10 additional workers, what will be the productivity?*



# Solution



A) *Productivity of labour =  $O/I$*   
*= 4, 000 Jackets/ (50 workers x 8 hour/day x 25 day)*

*= 0.4 jacket/ worker-hours*

B) *Productivity of labour = 4, 800 Jackets/ (60 workers x 8 hour/day x 25 day)*

*= 0.* **What do we understand from this?**





# SAM – Standard Allowed Minute

## SAM

□ is the time value arrived at for a task based on the average rate of output which qualified workers will naturally achieve

	Product	SAM (Average)	SAM Range
1	Crew neck T-Shirt	8	6 to 12
2	Polo Shirt	15	10 to 20
3	Formal Full sleeve shirt	21	17 to 25
4	Formal trouser	35	
5	Sweat Shirt (Hooded)	45	35 to 55
6	Jacket(Suit)	101	70 to 135
7	Women blouse	18	15 to 45
8	Bra	18	16 to 30



# SAM calculation

$SAM = \text{basic time} + \text{Allowance}(\text{personal}(10) \& \text{machine}(20))$

$\text{Basic time} = \text{cycle time} * \text{Rating}$





# Contracted Time

- ❑ It is time in contract of employment.
- ❑ It is measured usually hours x by number of operators to get total hours potentially available to factory or department



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# Attended Time

- ❑ It is usually the time operator spent in factory after excluding **lunch break** and any other **breaks** if any

Attended time = (Contracted hours - absence) = (shift hours - lunch breaks - tea break)



# Off- standard time

- ❑ Off standard time is that time utilized on performing tasks to which **SMVs are not allocated**.
- ❑ An operator can be off-standard while **waiting for work, machine breakdown, unmeasured work, repairs and rejects, etc...**

# On standard time

- ❑ This is the actual time worker spent on productive work. This is calculated as the **difference between attended time and off-standard time**
- ❑ On-standard time is used in calculating **operator**

**On-Standard time = Attended time - Off-standard time**

# Efficiency



- ❑ It is primarily a measure of the **effectiveness of the manager and supervisor** and as such is best applied to sections / departments / and not the individual operators
- ❑ Measurement of line utilization or line efficiency is a common measurement in sewing floor of apparel manufacturing organizations.
- ❑ Can be used to set incentive schemes



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# Efficiency



$$\text{Efficiency} = (\text{Minutes Produced} / \text{Minutes Attended}) * 100$$

$$\text{Efficiency} = (\text{SMV earned on standard} / \text{Minutes Attended}) * 100$$





## Efficiency

❑ **Minutes produced** is amount of work in terms of minute which the operator spends on productive work

❑ **Minutes Attended** is the total time operators

$(\text{Contracted hours} - \text{absence}) = (\text{shift hours} - \text{lunch break} - \text{tea break}) = \text{Attended time.}$

# Efficiency



- It is the measure of work done by operator.
- It is calculated from output generated in attended minutes and SMV of the operation.



# Example



- In a stitching floor there are 100 operators working in 8 hour shift and the SMV of product being produced is 10 minutes. If the average daily production of the style is 4000 Units/shift then the Line Utilization or line efficiency will be-

Minutes Utilized = SMV X Units / Shift =  $10 \times 4000 = 40,000$

Minutes attended = Number of Operator X Number of Minutes per Shift =  $100 \times 480 = 48,000$

So, Line utilization or **Line efficiency** is  $40,000/48,000 = 83.33\%$



# Example



***In a sewing line of 20 operators a style of 20 SMV is produced in 8 hour shift. If the average daily production of the style is 400 pcs/shift, Find***

- ☐ *The line Efficiency.*
- ☐ *The productivity*





# Answer



$$\begin{aligned} \text{Line Efficiency} &= \frac{\text{SMV} \times \text{output}}{\text{No. op} \times \text{working min}} \\ &= \frac{20 \times 400}{20 \times 480} \\ &= \frac{8000}{9600} \\ &= 0.8333 \\ &= 83.3\% \end{aligned}$$

$$\begin{aligned} \text{The productivity} \\ P &= \frac{O}{I} \\ &= \frac{400}{20 \times 8} \\ &= \frac{400}{160} \\ &= 2.5 \text{ pcs/worker-hour} \end{aligned}$$



# Capacity

- ❑ Capability to produce goods/services.
- ❑ Measuring capacity of a sewing line is commonly done in terms of number of garments produced per shift, per hour or per month.

- Example:-

Factory A - 1200 Shirts/day

Factory B - 1200 T-shirt/day

Which Factory has higher capacity?



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# Capacity

- Maximum capacity - e.g.
- Potential capacity
- Committed capacity
- Available capacity



# Actual Capacity

- ❑ Considers all the possible factors which can affect a line's performance.
- ❑ Used to set a target for a line for a specified period of time

**Actual capacity = planned production= target =  
(No. of operators x working minutes x attendance x line efficiency) / SAM of the garment**



# Example



- ❑ Capacity of one sewing operator is 60 minutes per hour maximum
- ❑ If a factory has 100 sewing machines, 8 hour (480 minutes) shift per day, then capacity of that factory would be  $100 \times 480$   
 $= 48000$  minutes per day
- ❑ This is considered theoretical maximum capacity, as it is assumed that operators are capable of working complete 60 minutes per hour, realistically which is impossible.
- ❑ There are several factors like operator efficiency and absenteeism that influences actual capacity.
- ❑ If the average efficiency of operator for that factory is 90%, then capacity would be 43200 ( $48000 \times 90\%$ ) minutes per day. If average absenteeism is 15% then actual capacity would be 36720 ( $43200 \times 85\%$ ) minutes per day.
- ❑ If a blouse style of 20 SMV is planned to be produced then we can expect 1836 pieces produced per day provided there are no other time loss.



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# Exercise



- ❑ *ABC Garment manufacturing PLC. Has an order of 3456 pieces of blouse to be produced in a line of 22 machines working for 8 hours per day. The work content for the blouse is 20 SAM. If there is 9% absenteeism and 80% line efficiency ;*
  - *What will be the average daily planned production of the line?*
  - *In how many days will the company be able to execute the order?*



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# Throughput Time



- ❑ Throughput time is a measure of the time required for a material, part or sub-assembly to pass through a manufacturing process following the release of an order to the manufacturing floor.
- + Throughput time or manufacturing cycle time consists of process time, inspection time, move time and queue time.
- + **Process time** -work is performed on the product itself.
- + **Inspection time** is the time during which the quality of the product is confirmed.
- + **Move time** - materials or works-in-process are moved from one workstation to another.
- + **Queue time** is the period of time during which the product awaits transfer to a workstation, undergoes further inspection and subsequent manufacturing processes.



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# Lead Time



- ❑ The time period between the placement of an order and the shipment of the completed order to the customer.
- ❑ A short manufacturing lead time is a competitive advantage; many customers want the delivery of their products as soon as possible following the placement of the order.



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# Work In Process - WIP



- ❑ WIP (Work in Process) is the number of garments under production at a given time. It includes the actual processing time and time a style waits to be processed ahead of each operation.
  - ❑ It includes the set at large of unfinished items for products in a production process.
  - ❑ These items are not yet completed but either just being fabricated or waiting in a queue for further processing or in a buffer storage.
- The term is used in production and supply chain management



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# Operator's Performance



- Many a times it is observed that floor or section or line efficiency is low but individual operator/s work very well.
- As the sewing is a team effort there are chances that one operator may not be able to perform well due to factors such as, *due to other operators or bottle necks, improper line balancing, line mismanagement, machine related problems etc. Due to such factors efficiency of line or section may reduce but not necessary that individual*

$$\text{Operator Performance} = \frac{(\text{SMV earned on-standard})}{(\text{On-standard time})} * 100$$



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# Exercise



- Calculate performance of an operator who is performing a pocket attach operation based on the below information.

Contracted time	9 hours
SAM of pocket attach	0.5 minutes
No. units produced in the shift	600 pcs
Lunch Break	30 minutes
Tea breaks	15 min. in morning, 15 min in afternoon
Machine breakdown	40 minutes
Waiting for work	30 minutes
Unmeasured work	40 minutes



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# Utilization

- Is the time spent on productive time out of the total attended time.
  - Formula:

$$\text{Utilization} = (\text{On-standard time} / \text{attended time}) \times 100$$



# Pitch time



- Theoretical operational time that each operator should take for planned balanced line.
  - **Formula**
    - SAM vale of style/Number of Operators required to meet target



# Floater

- Can perform all operations but at a much lower efficiency.
- Generally available to handle unforeseen circumstances.

## Cost per minute

**(Actual salary per day (operator + helper))/ Total garments produced X  
SAM) x 100**

# Exercise



❑ ***In a T-Shirt (Std. time per T-Shirt sewing is 6 minutes) manufacturing unit, where shift is of 8.5 Hrs. per day including 0.5 hr. for lunch break and the number of sewing machine operators are 20. At the end of day numbers of T-shirts produced are 1200 units.***

- ***The total minutes available for the work-force in the unit are.....***
- ***Avg. Std. minutes produced per operator are.....***
- ***Avg. Hourly production per operator is.....***
- ***Efficiency of the plant is.....***
- ***In-case the production in that day is 1500 T-shirts, the plant efficiency will be.....***



# Exercise



***As a supervisor, you are expected to set a line of auto pocket setting machines. The SAM of the operation is 0.6 min. and the shift is of 8.5 hrs. if the efficiency is at 95%,***

***□ How much machines will you require in the line to produce 25,000 pieces?***





# Exercise

***In a Garment Manufacturing Setup, 6000 garments need to be produced in four days (working minutes available per day per person are 480 minutes)***

## ***Calculate-***

1. Required Hourly Production Rate
2. Total Manpower required
3. Number of Floaters required
4. Number of Skilled Operators required

## **Given Data-**

Standard minute/garment- 15.0 Min.

Absenteeism- 10%

Line Efficiency- 85%

Predicted Avg. Performance on standard 90 %.

Floater's Performance 60 %.



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# Floor exercise



- ❑ Keen observation, setting up a line etc are one of the tasks of a supervisor.
- ❑ Observe the processes in cutting, sewing and finishing sections and identify at least **3 problems** in each section and come up with **suggested solutions**. Present what you have got in the class room.

( Divide yourselves in 4 groups)



# Floor exercise



**❑ Select a line and a style to study. Use information from Direct observation, production book, IE, etc and find out;**

- The theoretical maximum capacity of the line in terms of minutes
- SAM value of the product
- The average pieces per man-hour (productivity)
- Average standard minutes produced per operator
- Average hourly production per line and per operator.
- Efficiency of the line
- Set the target for the next day assuming the line will continue to work on similar efficiency level, same product and no absenteeism.

**\*\* Use the production data of the last 10 days**



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# Thank You

